

**Navigation Procedures****Initial Preparation for this Procedure**

<b>Step</b>	<b>Procedure</b>	<b>Explanation</b>
1	Map all underground utilities with their original locations.	Have a volunteer who is familiar with the operation of the Newton/GPS Unit and the procedures of Supplement 1.5 separate and hide the list of labels found under the material list of this section. Set up a new project called <b>Utilities</b> . Set up a separate station name for each label using the label name. Choose <b>Average from Display</b> for the method of data collection. Take an average at least 30 different points at each station. This will establish the “original locations” of all underground utilities and the activity is ready.

**Starting FieldWorker Pro**

<b>Step</b>	<b>Procedure</b>	<b>Explanation</b>
2	Turn on the Newton.	Switch is on left side.
3	Tap the <b>Extras</b> icon.	Use the touch pen supplied with the unit. The word tap will be used in this document to mean actually taking the touch pen supplied with the unit and physically touching the screen and slightly pushing in on it with the end of the pen.
4	Tap <b>FW Pro</b> icon.	This starts the FieldWorker Pro.

**Finding a Project**

<b>Step</b>	<b>Procedure</b>	<b>Explanation</b>
5	Tap the icon at the top of the screen directly to the right of the <b>Project</b> icon.	This will pull down a menu that will list all of the <b>Projects</b> containing data that are currently stored on the <b>Newton</b> .
6	Tap <b>Utilities</b> .	This will open the <b>Utilities</b> Project that you will be working on.

**Finding the Desired Station Number**

7	Tap the <b>Station</b> icon directly below the <b>Project</b> icon.	This pulls down a menu with the following options: <b>New</b> , <b>Duplicate</b> , <b>Delete</b> , <b>Go to ...</b> , <b>Import</b> and <b>Export</b> .
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8	Tap <b>Go To...</b>	<p>On the <b>Go To <u>Number</u> line</b>, write the number of the station that you wish to begin using, which in this case would be <b>Station Number 1</b>. If you are currently on <b>Station Number 1</b>, simply tap the <b>OK</b> icon and you are ready to proceed to step # 10.</p> <p>However, if you are not currently on <b>Station Number 1</b>, you may change to <b>Station Number 1</b> by one of the two following options.</p> <p>Use the <b>Keyboard</b> to “type” the number of your Station.</p> <ul style="list-style-type: none"> <li>• Tap the <b>Keyboard</b> icon (3<sup>rd</sup> icon from bottom left-hand corner of the screen).</li> <li>• Before the <b>Keyboard</b> can “type” the number of the station on the <b><u>Number line</u></b>, you must tap the right end of the number already entered on the line with the touch pen. A <b>caret ^</b> will then appear below the line allowing you to now use the <b>Keyboard</b>. You will use the delete (del) key to delete the number entered on the line.</li> <li>• Type the new number of your station you want to go to using the touch pen like you would your fingers on a keyboard.</li> <li>• When you have numbered the station, then tap the <b>X</b> at the bottom right corner of the <b>Keyboard</b> icon to close the <b>Keyboard</b>.</li> </ul> <p>OR</p> <p>You may use the touch pen to scratch out (delete) the old number and write your new station number on the blank. If there is more than one person using the Newton, our recommendation is to use the keyboard procedure above instead of each user individually training the Newton to read his/her handwriting style. (The Handwriting Supplement 1.8 is included for those who wish to try this method.)</p>
9	Tap the <b>OK</b> icon.	<p>When the correct <b>Station Number</b> is listed on the <b>Go To <u>Number</u> line</b>, tap the <b>OK</b> icon to take you to <b>Station Number 1</b> under the <b>Utilities Project</b>.</p>

**GPS Test**

<b>Step</b>	<b>Procedure</b>	<b>Explanation</b>
10	Connect the GPS unit to the Newton.	Lift the Velcro flap of the backpack exposing two cords. The coiled cord plugs into the side of the Newton.
11	Tap the <b>i</b> icon.	The <b>i</b> icon is located in the bottom left-hand corner of the Newton's screen. This action will give you the opportunity to now go to the second option of <b>GPS Test</b> . This is a quick check to see if the Newton and the GPS unit are communicating with each other and also with the satellites overhead.
12	Put GPS unit in <b>Transmit Mode</b> .	The Transmit Mode is the term used by the Newton to tell you to turn on the GPS unit. The uncoiled cord located under the backpack flap is the on/off cord. <b>Pull out the black end of the cord from the backpack pocket. Depress the button on the end of the black switch.</b> When the red light is lit, the GPS unit is in the transmit mode.
13	Tap <b>Test</b> .	If the Newton and the GPS unit are communicating with each other, data representing longitude, latitude, elevation and how many satellites are referenced will scroll across the screen. For more information, see <b>Note #1</b> .

**Note #1**

If the two units are not communicating, you will receive the following message: **Searching for the GPS Receiver**. You will also hear a high-pitched sound like a mouse squeaking or a bird chirping (instead of the ding heard when a data point is recorded). This sound means that it is trying to make data readings, but it is not being successful. If the Newton and GPS units are communicating, then you will be told how many satellites the GPS unit is referencing and GPS readings will continuously scroll down the screen. If not, you will be told that there are not enough satellites that can be referenced to obtain a good reading. There could be several reasons why the **not enough satellites** message would appear. Perhaps there are not enough satellites to obtain a good reading, or the GPS battery might not have enough energy to reference the satellites. Also, the batteries in the Newton could be low, or the skies might be so cloudy that the satellites cannot be accurately received.

**Starting the Navigator Function**

14	Tap the <b>Show</b> icon.	At the bottom right middle of the screen is the <b>Show</b> icon. Tap it and it will give you the following options: <b>List, Map</b> and <b>Navigator</b> .
15	Tap <b>Navigator</b> .	The Navigator screen will now be displayed. At the

		top of this screen the longitudinal-latitudinal location of the actual buried utility will be displayed. This is the location you are trying to find. Directly below this is listed the <b>Distance and Bearings to Object</b> , meaning how far away from the buried utility you are and what direction you need to go to get there. Below this will be a 180-degree semi-circle compass display with a pointer indicating the direction you are to walk from your current location to find the “underground utility.” Below the directional indicator will be a display of your actual longitudinal-latitudinal location.
16	Go <b>Navigate</b> .	Begin slowly walking in the direction the pointer needle is pointing. Watch the distance readings and also the longitude and latitude readings to see how they change. You are to <b>Navigate</b> until you find the hidden object. Note that if you are walking toward the object’s location, the half circle of the compass will be pointing away from you. If you bypass the desired location the screen will invert and the half circle of the compass will be pointing toward you, indicating that you need to turn around and walk the opposite direction.
17	In <b>Target Area</b> .	When you are close to the targeted location, a dialog box will appear stating that you are <b>In Target Area</b> . The precision of the SATLOC GPS unit is + or – 1 meter. When you are <b>In Target Area</b> , begin to look closely at the latitude and longitude numbers to match them as closely as possible. When they match, the object you are looking for is within a circle whose radius is approximately 3 feet. The “underground utility” is somewhere below. Look on the ground for a piece of paper with the name of the utility written on it.
18	Object found.	If this were a real life situation, the contractor or person who wanted to do the digging would have to carefully dig in the indicated area looking for the actual pipe or cable. The GPS unit would have gotten him close enough where actual digging would be practical.

### Navigating to Find other Locations

19	Repeat the procedure for other underground objects.	Locate other “hidden utilities” by the same procedure, or give the unit to another student for them to locate the next object.
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